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U.S. Patent Application No. 10/678,975
Attorney Docket No. 352003-991290 (Formerly 2102487-991290)

Amendments to the Specification

Please amend the Abstract as follows:

ABSTRACT OF THE DISCLOSURE

An apparatus for selecting test patterns in accordance with an embodiment of the present invention has a first test pattern selecting module ~~configure~~ **configured** to define selected test patterns and unselected test patterns, a fault simulation module configured to simulate whether test patterns detect faults, a weighting module configured to add a weight to each of the first undetected faults, a fault sampling module configured to extract second undetected faults from the first undetected faults to which given the added weight weights are given, and a second test pattern selecting module configured to extract additionally selected test patterns based on the added weight.

Please amend the Specification as follows:

On page 4, replace the paragraph beginning at line 2 with the following:

In addition, a method for adding a weight reflecting layout information on circuit elements to each fault is proposed in published Japanese Patent Application P2000-276500. Such weight is calculated by referring to logic connection nodes and layout information of the circuit.

On page 4, replace the paragraph beginning at line 26 with the following:

The selecting information "r" ($0 \leq r \leq 1$) is a parameter to adjust weight ratio of each of W_s and L_s in the equation (1). A large value of the selecting information "r" attaches more importance to the normalized weight of faults (W_s) than to the normalized length (L_s) of an unselected test pattern, which leads to the result that the unselected test patterns detecting faults of which total weight W_t is large are selected as the candidate test patterns. However, the

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unselected test patterns of which each step number L_1 is large to induce a long test time, are possibly selected. In contrast, the unselected test patterns of which each normalized pattern length L_2 is small are effectively selected as the candidate test patterns by a small value of the selecting information "r". However, the number of detected faults does not increase rapidly with the number of candidate test patterns of which each step number L_1 is short, which requires more calculation to obtain the objective fault coverage in the second test pattern selecting module 26. Such calculation may require larger CPU resources. Therefore, the selecting information "r" is assigned to appropriate value with reference to an experimental database, for example. Each weight that is added to each of the faults is also assigned to appropriate value reflecting influences from detected faults as explained in FIG.2.

On page 27, replace the paragraph beginning at line 5 with the following:

With reference again to FIG.1, the fault simulation module 21 simulates whether the additionally selected test patterns included in additionally selected test pattern set 35 detect the first weighted undetected faults included in the first weighted undetected fault list 310b. Among the first undetected faults, detected faults by the fault simulation and the first detected faults included in the first detected fault list 30a are merged and saved in the fault list file 2 as a final weighted detected fault list 30c. In contrast, among the first undetected faults, faults remain undetected by the fault simulation are saved in the fault list file 2 as a final weighted undetected fault list 30d. The fault simulation module 21 calculates a weighted fault coverage D by the following equation (6).

On page 35, replace the paragraph beginning at line 23 with the following:

The order of the method is not restricted to FIG.4. For example, instead of carrying out S605 and then step S606, S606 may be carried out after S608. In addition, the above description discussed that S06 is terminated in S603 and S611 if all unselected test patterns detect few or no faults or faults which that are given an weight weights of 0 or nearly 0 are given. However,

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this processing may increase substantial repetition of loop 312 and loop 313. In this case, if unselected test patterns that are not yet evaluated are estimated in total to contribute a fault coverage of less than 0.1%, terminating S06 is an alternative. In addition, if the minimum total number of the selected test patterns and additionally selected test patterns is required in manufacturing tests, extracting the all first undetected faults as the second undetected faults in S04 and extracting single candidate test pattern in S604 is also an alternative even though the alternative may require large CPU resources.

On page 38, replace the paragraph beginning at line 13 with the following:

The first detected and undetected faults included in the first undetected fault list 310a are entered into the weighting module 23 with the layout information 36 and the layout parameter information 65. The weighting module 23 outputs the first weighted undetected fault list 310b including the first weighted undetected faults. The first weighted undetected fault list 310b ~~are~~ is entered into the fault sampling module 24. The fault sampling module 24 extracts the second undetected faults from the first weighted undetected faults by a criterion of the weight and outputs the second undetected fault list 31. The second undetected fault list 31, the unselected test pattern set 34, the gate level net 38 and the basic cell library 160 are entered into the fault simulation module 21. The fault simulation module 21 generates the additionally detected fault lists by unselected test patterns 32.

On page 42, replace the paragraph beginning at line 3 with the following:

Here, W_h is the total added weight that ~~are~~ is given to the extracted faults and W_a is the total added weight that ~~are~~ is given to all faults.

On page 42, replace the paragraph beginning at line 23 with the following:

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Entering the faults detected by every selected test pattern in the second test pattern selecting module 26 and outputting reduced selected test patterns and the first undetected fault list 310a and the first weighted undetected fault list 310b is ~~other~~ another embodiment of the invention. In this manner, a test pattern of which step size is minimum is extracted in the first selection, therefore, each step size of the selected test patterns becomes small.